Proposition de recherche doctorale

Optimisation des ressources pilotée par la cartographie (environment aware radio ressource management in next generation radio access networks)

Mots clés :

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- Domaine scientifique principal: Divers

Résumé du projet de recherche (Langue 1)

Environment aware radio resource optimization in next generation radio access networks Context The Radio Environmental Map [1][2] is a promising concept for storing radio environmental information that can be used to enhance radio resource management in wireless networks. The concept of REMs has been first proposed by the Virginia Tech team [1]. They define REM as a database that contains information on the radio environment, including geographical features, available services, spectrum policies and regulations, location and activities of radio devices, past experiences etc. This database can be located anywhere in the network with different possible architectures: centralized, distributed or hybrid. Related with the architectural aspects, the amount of signalling overhead needed to disseminate the REM is of concern and treated in [4]. The REM proposed as such, has been mainly considered for IEEE 802.22 WRAN scenarios and applications [4][5][6] where the focus is on opportunistic spectrum access on TV whitespaces. Our conception of REM is more general than the existing database approach described above. We define REM as an intelligent entity which stores incoming radio environmental data but also interpolates this data to benefit from the spatial correlation that exists in the data. The concept of collecting geo-localized information on the radio environment and constructing a map using this information has also been investigated and developed further by other research groups [2][7][8]. In these works, REMs have been handled in a more general Cognitive Radio (CR) context than TV whitespaces and it is considered as a mean to represent spatio-temporal characteristics of the radio environment by using concepts and tools from spatial statistics, like point processes, spatial random fields, pair correlation functions, point interaction models, spatial interpolation techniques, etc. With the fast standardization of Minimization of Drive Tests (MDT) in 3GPP, which is a framework for geolocated measurement reporting for 3G and 4G, the first MDT solutions have already started to appear in vendor equipments. It is estimated that MDT-capable mobile penetration will increase rapidly between 2012 and 2015, reaching more than half of the existing mobile devices in 2015. Besides, geo-location information is gaining momentum and popularity in the wireless arena with the flood of geo-location based applications on smartphones and tablets. Due this trend, conventional network planning and optimization vendors are converging towards geo-located measurement processing; and new actors and businesses that propose geo-location based solutions/applications are emerging.

Résumé du projet de recherche (Langue 2)